

3.—CONTRIBUTIONES FLORAE AUSTRALIAE OCCIDENTALIS XII.

By

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INTRODUCTION.

Amongst the large number of undescribed species selected from the material worked over during the past year, three of unusual interest have been selected for early publication. In September, 1945, whilst engaged on a survey of plants for examination for their economic possibilities as potential sources of drug materials, two interesting psammophytes growing in the sandy flat of the Mortlock River came to notice. A search for fruiting material was subsequently made in October, December and January, but without success, only one ripe and partially damaged fruit being found unattached below one of the plants, but sufficient is now known to place these plants in the family Chenopodiaceae, although they seem to be anomalous in this family. The solitary flowers, strictly unisexual and dioecious, the homomorphic perianth, and the absence of bracteoles, together with the stamens isomerous with and opposite to the perianth-segments, and the three-partite styles, make these plants quite distinct from anything hitherto described, and show a certain affinity to the Caryophyllaceae, although the position of the stamens and the nature of the styles is entirely that of Chenopodiaceae. Remarkable too is the difference in the phyllotaxis of the two species,—in one closely spirally imbricate leaves; in the other opposite leaves or the leaves in opposite fascicles, with elongated internodes and spinescent branches. The former has the habit of some species of *Pycnophyllum* (Caryophyllaceae); the latter is reminiscent of *Rhagodia* (Chenopodiaceae). This genus I have named *Roycea*, after my companion of these travels, who first noticed *R. pycnophylloides* by reason of its bright orange-red anthers protruding from the sand-covered tufts of the plant. The second species was discovered while searching for fruits of the first. Until ripe fruits have been found, it would be unwise to assign this new and interesting genus to any particular section of the family.

The second genus is of exceptional interest from the point of view of plant-geography, since it forms another link between the American and Australian continents.

In March, 1944, Mr. C. D. Hamilton, the District Forester at Mundaring, a township less than thirty miles from Perth, brought me a branch of *Daviesia pectinata* from which protruded the flowers of a species of *Ptilostyles*, of the Section *Eupilostyles*. The occurrence of this genus in South Western Australia is of more than passing interest; not only is it the first record of any of the

Rafflesiaceae in Australia, it is also a species belonging to a Section of a genus hitherto recorded only from America, and it is, apart from *Trichoclina*, the only genus restricted to South America and South Western Australia. This relationship, usually exhibited by the Antarctic Element, is, as a rule, more strongly represented in New Zealand, Tasmania and Victoria than in any other part of Australasia, and is exemplified most strongly by Proteaceae, *Centrolepis*, Stylidiaceae and Epacridaceae.

The distribution of the Rafflesiaceae is interesting. Of the four Tribes, the Rafflesiae, all large-flowered species, are restricted to the Indo-Malayan region;—*Rafflesia* with 12 to 13 species being found in Malaya, Malacca, Borneo and Sumatra; *Sapria*, with one species endemic in the Eastern Himalayan region, and *Rhizanthus* with two species from Java, Sumatra, Borneo and Malacca. All of these are found on the roots and stems of the Vitaceae. The Tribe Mitrastemoneae, with the single genus *Mitrastemon*, comprising three species, extends from Southern Japan to Sumatra, and is parasitic on the roots of Fagaceae. The Tribe Cytineae includes two genera, *Cytinus* and *Bdallophyton*; the former, with six species, extends from the Mediterranean Region to South Africa and Madagascar, and has various host plants, while the latter genus, *Bdallophyton*, with four species, is restricted to Mexico, and also has various host plants.

The Tribe Apodantheae comprises two genera, *Apodanthes* and *Pilostyles*. The former, with two species, is parasitic on the Flacourtiaceae (*Casuarina*) and is restricted to Tropical America. *Pilostyles* on the other hand, is the most widely distributed genus of the family. § *Eupilostyles* Harms. has fifteen species extending from California and Texas to Brazil and Chile. The various species are parasitic on the three families of the Leguminosae, each species occurring on a single genus, five occurring on *Calliandra* and *Mimosa* (Mimosaceae), three on *Bauhinia* (Caesalpinaceae) and the remainder on *Dalea*, *Adesmia*, *Galactia* and *Parosela* (Papilionaceae). The new species described below is the first extra-American species to be recorded, and is parasitic on a genus of the Podalyriaceae (Papilionaceae). § *Astragalanche*, with one species, is restricted to Persia, where it occurs as a parasite on species of *Astragalus* (Papilionaceae-Galegeae), and the § *Berlinianche* with two species is restricted to tropical Africa, where it occurs as a parasite in the branches of *Berlinia* and *Brachystegia* (Caesalpinaceae-Amherstiacae).

Pilostyles is perhaps the smallest-flowered genus of the Rafflesiaceae, and all appear to be stem parasites with a restricted range of host-plants. The new species is related to the American plants, just how closely I do not know, but the absence of a distinct perianth-tube, the clawed perianth-segments, and the canal or tube of the column of the male flower are points which I have not been able to associate with any other species of this Section.

The evidence suggests that *Pilostyles* is an Antarctic Element which had its origin in the great southern land. The main branch (§ *Eupilostyles*) had two migration routes—one northwards in the American continent, where its distribution now extends over the tropical and warm regions, and a second migration route of which the only evidence we possess is this new species in South Western Australia. The § *Berlinianche* of tropical Africa, represent a third migration route which may have terminated there, and this appears probable, for there are structural peculiarities in this Section which indicate that the Persian species is not derived from them. The Persian species (§ *Astragalanche*) seems to be most closely related to the South American species. If this is true, then it is probable that it has reached Persia by way

of the great traffic route which formerly extended from Antaretica to Europe by way of Australia and Persia, with India and the Mediterranean as intermediate points. If such is the case, then *Pilostyles* should be looked for in Eastern Australia. The fact that it has only now been discovered in South Western Australia, and so close to the Metropolis, indicates how little known the Australian flora is today, and further, the species which is only in evidence when in flower (and perhaps also in fruit) may easily be mistaken for some monstrosity, such as a gall-flower.

***Pilostyles Hamiltonii* C. A. Gardn. sp. nov.**

Alabastra 2 mm. diam., ovoideo-globosa, solitaria, e cortice irregulariter erumpentia, saepe numerosa. Flores carnosii, exterius atro-purpurei, intus roseo-sanguinei. Bracteae plures, fere 9-11, biseriatae, imbricatae, exteriores ovatae vel ovato-orbiculatae, obtusae, minores longitudine medio perianthii, interiores (fere 5) oblongae vel ovato-oblongae, obtusae, concavae, integrae vel crosso-laceratae. Perianthii segmenta 4-6, soluta, imbricata, ad basin attenuata vel constricta, oblonga vel oblongo-spathulata, integra, obtusa, et sicut bracteae tenuiter striata. Discus epigynus carnosus, sub-verticalis. Columna in floribus masculis cylindrica, fere equalis perianthio vel rare longior, apice incrassata et alte convexa vel capitata, tubulata et breviter bilobata, margine fimbrio-papillosa minutis papillis; antherae numerosae, submargine dense biseriatae, uniloculares, poris terminalibus aperientes, demum evanescentes ita ut raro matrae videri possint. Ovarium in floribus feminis ovoideum vel ovoideo-cylindricum, semi-inferum vel fere superum, uniloculare; discus carnosus, parvus, cum ovario et stigma plus minusve continuus; stigma alte convexa seu capitata, sine additamenta; ovula numerosa, utrinque in parietibus placentae; placentae primum distinctae, demum pendentis, et tunc ovula undique in ovarium sparsa. Fructus ignotus.

Habitat in distr. Darling dicto prope flumen Helena in pago Mundaring Weir, parasitica in caulibus et ramis plantae *Daviesia pectinata*; fl. mense Martio. C. D. Hamilton, Martius 1946. (Typus in Herbario Perthense).

Haec planta est memoratu digna non solum quia est unica species huius subgeneris (*Eupilostyles*) extra Americani, sed etiam ob angustam et tubulatam partem genitalium in masculo, et ob segmenta perianthii cum basibus angustis et quasi-ungulatis in floribus amborum sexuum. Haec est prima species in Australia inventa, et inventa fuit parasitica in quodam genere *Podalyricarum*.

Haec planta vocata fuit in honorem Caroli Donaldi Hamilton cuius sapientibus observationibus ego in notitiam plantae veni. Nomen etiam praestat avo suo mortuo, A. G. Hamilton, qui suis operibus, notatu dignis, scientiae plantarum Australiae contulit.

ROYCEA.

***Roycea* C. A. Gardn. gen. nov.** (Chenopodiaceae-Chenopodioideae).

Flores dioici, ebracteati et ebracteolati, profunde 4-5-fidi, tubus breviter turbinatus, segmenta perianthii imbricata, aequalia vel leviter inaequalia, ovata vel obovata (rarius orbicularis), concava obtusa, marginibus membran-

accis et ciliatis, dorso pubescentibus, post anthesin persistentia et immutata. Flos masculis: stamina numero partium perianthii isomera iisque opposita; staminodia nulla; filamenta subulata, libera, hypogyna, perianthio longiora vel breviora, antherae dorsifixae, didymae, ovatae, biloculares, loculi paralleli; ovarium rudimentarium. Flos femineus; Perianthium ut in masculis: stamina et staminodia nulla; ovarium superum, ovoideum, vertice in stylum brevem angustatum, multiloculare; stylus terminalis, rami 2-3, obscuro-purpurei, elongati, introrsum papilloso (vel stigmata 2-3 sessilia basi connata vel fere libera, interdum elongata); ovulum solitarium, amphitropum e funiculo basali elongato suspensum. Fructus probabiliter utriculus membranaceus, perianthio inclusus, indehiscens, in statu maturo non visus.—Suffrutices humiles, glabri vel pubescentes; caules teretes, erecti vel decumbentes. Folia exstipulata, spiraliter disposita et arcte imbricata, vel opposita cum longis internodiis, integra, plus minusve concava. Flores virides, parvi, sessiles, solitarii, axillares vel terminales. Perianthium post anthesin persistens, immutatum.

Nominavi in honorem Roberti Dunlop Royce, adjutoris Herbarii Perthensis, qui has species mecum legit.

Hoc genus videtur esse aliquantulum anomalum in familia Chenopodiacearum, et ejus locum systematicum, fructu maturo non viso, remanet obscurum. Plantae videntur esse striete unisexuales, et foliorum copia est insueta. Genus habet quandam similitudinem cum *Caryophyllaceis* (*Alsinoideis-Pycnophylleis*), sed stamina hypogyna stylusque etc. sunt Chenopodiacearum. Plantae occurrunt cumulatae in salinis arenis in alveo fluminis "Mortlock" prope Meekering, in caules foliisque earum remanent fere totaliter sepulti in terra; solis antheris de facto, conspicuis remanentibus, specialiter in *R. pycnophylloides*, et plantae adhuc non florescentes facile inadvertuntur. Variis conatibus non obstantibus a mense Septembri usque ad Januarium fructum maturum non fuit inventum; et semina frondes inventa, sunt semina cuiusdam plantae e *Caryophyllaceis*. Attamen evidentiis sufficiens obtenta est ad affirmandum factum quod fructum sit utriculorum. In absentia melioris materialis (fructus) hic ponendus est forsitan immediate post *Enchylaena*.

1. *Roycea pycnophylloides* C. A. Gardn. sp. nov.

Suffrutex ramosus, ramulis numerosis, plus minusve fastigiatis, pubescentibus; foliis dense spiraliter dispositis, arcte imbricatis. Folia ovato-oblonga vel ovata, sessilia, exstipulata, plus minusve concava, uninervia, glaucescentia, marginibus membranaceo-ciliata, 2 mm. longa. Flores parvi, virides, terminales vel in axillis superioribus solitariis, sessiles, inconspicui. Perianthium vix 1 mm. longum, 4-5-partitum, tubus brevissimus aut plus minusve nullus, segmenta ovata vel obovata, raro orbicularia, obtusa, marginibus membranaceis et albo-ciliatis, dorso pubescentibus. Stamina in floribus masculis 4-5, perianthii segmentis opposita et isomera; filamenta subteretia, glabra, segmentis perianthii aequilongis; antherae roseo-auratae, magnae, late ovatae; ovarium rudimentarium. Flos femineus; Perianthium sicut in floribus masculis. Ovarium liberum, ovoideum, stylus brevis, profunde divisus, lobis erecto-patentibus, perianthii segmentis longe excedentibus. Fructus ignotus.

Hab. in distr. Avon, prope Meekering, in flumine "Mortlock River," in aperte arenosis salinis, fl. m. Septem. Gardner 7659. (Typus in Herbario Perthense).

2. Roycea spinescens *C. A. Gardn.* sp. nov.

Suffrutex ramosus, ramis ramulisque erectis, rigidis, ramulis in spinam terminantibus. Folia opposita vel in fasciculis oppositis, oblonga, integra, sericeo-pubescentia, demum glabriuscula, ad basin in calcarem breviter resoluta infra insertionem, concava vel leviter carinata, coriacea, obtusa, apice paululum recurva, 2.5-3.5 mm. longa. Flores solitarii vel gemini, sessili in axillis vel fasciculis foliorum. Perianthium globosum, profunde 4-5-fidum, segmenta fere libera, late obovata, ovata vel orbicularia, marginibus membranaceis et ciliatis, late hyalinis exterius pubescentibus, 2 mm. longa. Stamina segmentis opposita eisque isomera, libera, filamenta segmentis vix excedentia. Ovarium in floribus masculis abortivum, cylindricum, pubescens. Perianthium in flore feminea ut in masculis. Ovarium ovoideum, sursum pubescentem, stylus brevis, profunde divisus, lobis atro-purpureis, perianthii segmentis longe excedentibus, demum patentibus.

Hab. in distr. Avon prope Meckering, in locis depressis salinis (ita dictis "Mortlock River") fl. in. Oct. *Gardner* 7659a. (Typus in Herbario Perthense).

Haec species tam dissimilis *R. pycnophylloides* in habitu et phyllotaxis (seu foliorum formationem) crescit simul cum specie dicta, sed in locis leviter minus salinis.

Plate I.

Pilostyles Hamiltonii *C. A. Gardn.*

Parasitic on stems of *Daviesia pectinata* Lindl.

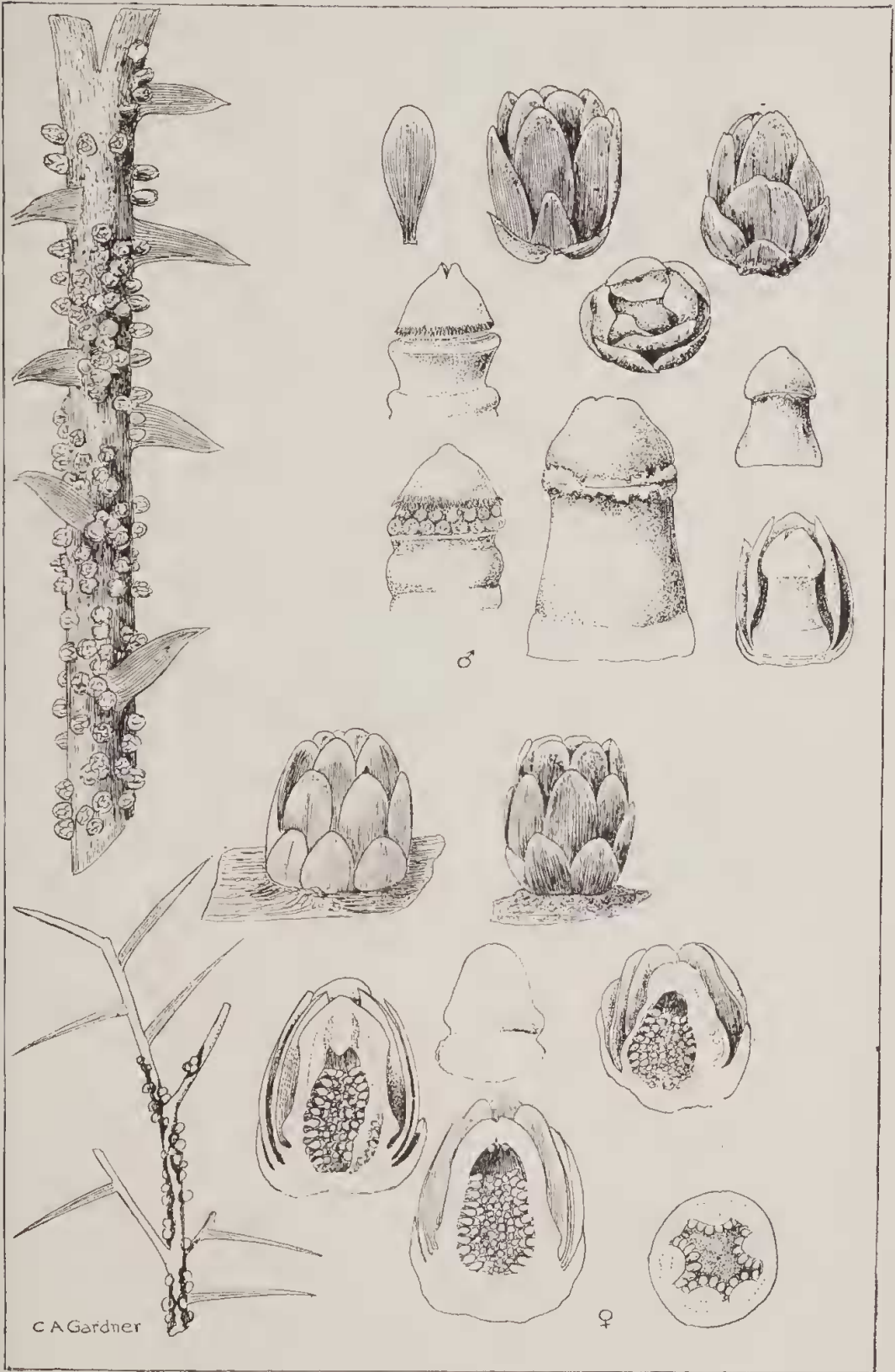


Plate II.

Roycea *C. A. Gardn.*

A–K, **R. pycnophylloides** *C. A. Gardn.* A, habit. B, branchlet. C, leaf. D and E, ♂ flowers. F, perianth-segment. G, anthers. H, ♀ flower. I, ovaries and styles. K, section through ovary. L–S, **R. spinescens** *C. A. Gardn.* L, habit. M, branchlet. N, under-surface of leaf. O, side view of leaf. P, ♂ flower. Q, perianth-segment. R, ♀ flower. S, ovary and style.

